

In the Claims:

1. (Currently amended) A method for the plastic deformation of polymers, comprising treating polymers with electromagnetic radiation having a defined wavelength selected from the wavelengths in the range from 0.8 to 100 μm , and simultaneously treating the polymers with pressure and shearing and thermal energy, wherein the method is carried out at a temperature which is below the temperature at which the polymer melts and wherein the electromagnetic radiation has a defined wavelength which is selected so that it corresponds to the bond energy of the secondary valency bonds of the polymer.
2. (Currently Amended) The method according to claim 1, wherein the thermal energy heat is supplied to the polymer or heat is removed from the polymer during the method.
3. (Previously presented) The method according to claim 1, wherein the electromagnetic radiation is laser radiation.
4. (Previously presented) The method according to claim 3, wherein the electromagnetic radiation has a wavelength in the range from 1 to 50 μm .
5. (Previously presented) The method according to claim 1, wherein the pressure acting on the polymer is in a range from 1 N/mm² to 5000 N/mm².
6. (Previously presented) The method according to claim 1, wherein the shearing is applied with a force or a torque such that a shear rate in the range from 10° to 10⁶ s⁻¹ acts on the polymer.
7. (Previously presented) The method according to claim 1, wherein the polymer comprises a polymer which can form intermolecular hydrogen bridge bonds.

8. (Previously presented) The method according to claim 7, wherein the polymer which can form intermolecular hydrogen bridge bonds is a polysaccharide or polyvinyl alcohol.
9. (Previously presented) The method according to claim 8, wherein the polymer which can form intermolecular hydrogen bridge bonds is selected from the group consisting of cellulose, chitin, polyvinyl alcohol, a constitutional isomer of cellulose, a constitutional isomer of chitin and a blend of one or more of the above polymers.
10. (Previously presented) The method according to claim 9, wherein the polymer which can form intermolecular hydrogen bridge bonds is cellulose.
11. (Currently Amended) The method according to claim 1, wherein the deformed polymer is melted by means of electromagnetic radiation having a wavelength in the range from 0.8 to 100 µm under the simultaneous action of pressure and shearing and thermal energy and is then extruded and spun to give fibers or processed by injection moulding to give a moulding.
12. (Withdrawn/Previously presented) An apparatus comprising a means for holding a polymer, a means for exerting pressure on the polymer, a means for shearing the polymer, a means for supplying or removing heat and a means for irradiating the polymer with electromagnetic radiation having a wavelength of from 0.8 to 100 µm.
13. (Withdrawn/Previously presented) An apparatus according to claim 12, wherein the means for irradiating the polymer with electromagnetic radiation having a wavelength of from 0.8 to 100 µm is a laser.
14. (Withdrawn/Previously presented) An apparatus according to claim 12, wherein the means for shearing the polymer comprises two ram surfaces movable relative to one another.

15. (Withdrawn/Previously presented) An apparatus according to claim 12, wherein the means for exerting pressure on the polymer are also simultaneously the means by which the polymer is sheared.
16. (Withdrawn/Previously presented) A polymer comprising cellulose or chitin, obtainable by the method according to claim 1.
17. (Withdrawn/Previously presented) The polymer according to claim 16, which is a film, fibre or moulding.